AKER

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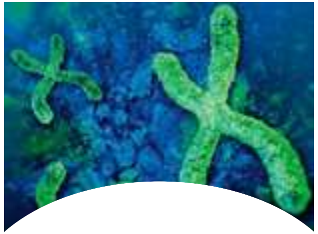

European
Cooperative
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for Plant
Genetic
Resources

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Confidentiel

Bioversity International

Financed by

Bruno Desprez

Venise, I

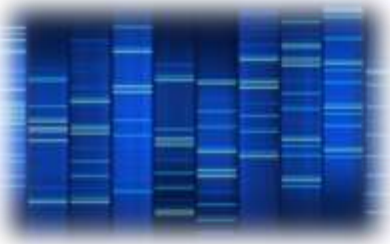
19th June 2018

AKER Programme – For a competitive innovation

Progress made since the last meeting

Participants of the fourth joint meeting of the ECPGR working group on Beta and the WBN, 20-22 June 2012, Cappelle-en-Pévèle, France (photo: company Florimond Desprez)

AGENDA



Introduction

1. AKER strategy

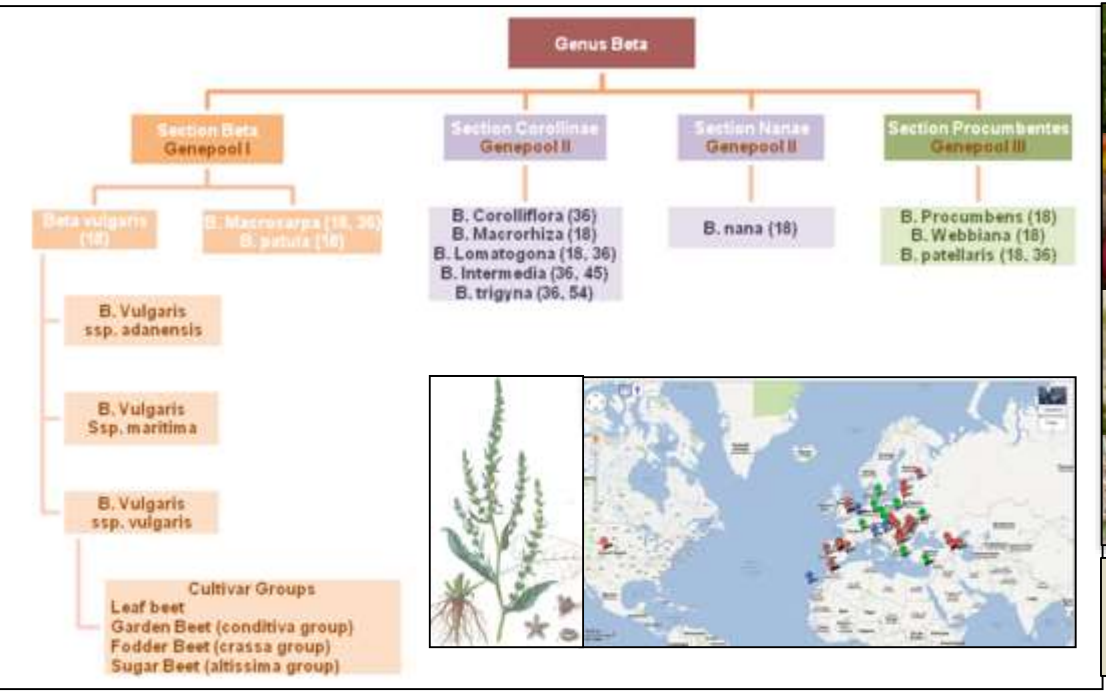
2. AKER 's results

3. AKER's partnerships and discussion

Conclusions

Introduction

- Genetic resources available in the genus Beta.
  - Only accesions from the Group I 46 genebanks



Réf. *Beta maritima*, the origin of beet,
E. Biancardi, L. W. Panella, R.T. Lewellen, 2012

Global AKER project frame

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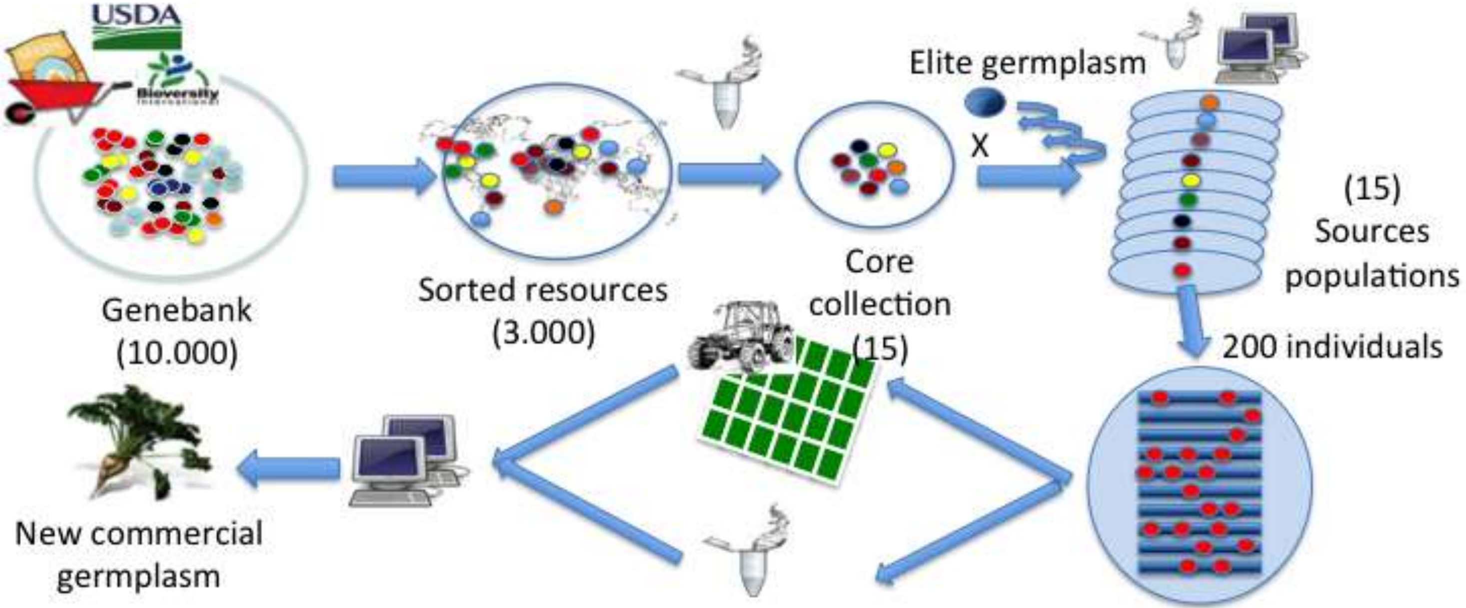


Genebank
(10.000)

Sorted resources
(3.000)

Core
collection
(15)

Elite germplasm

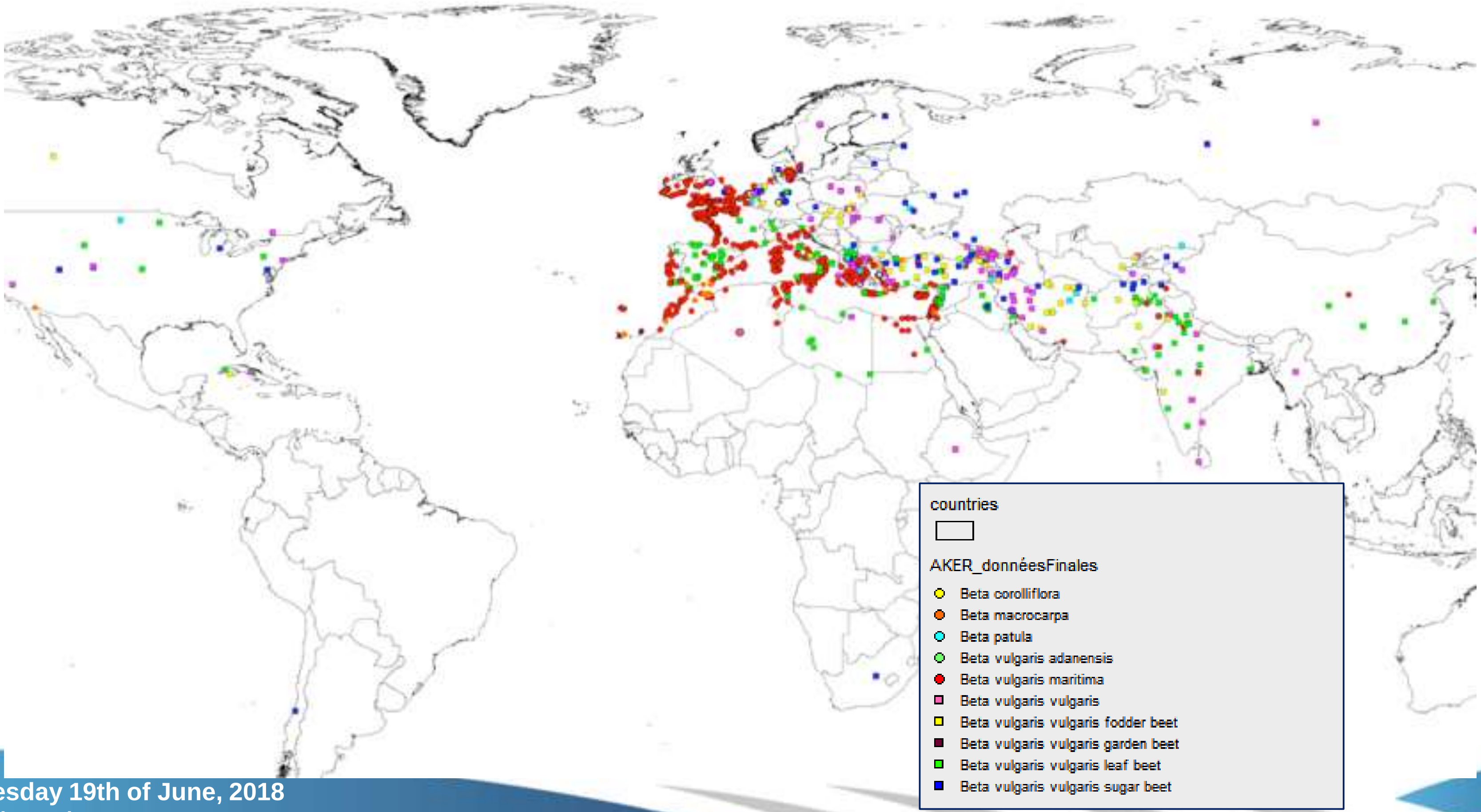
X

(15)
Sources
populations

200 individuals

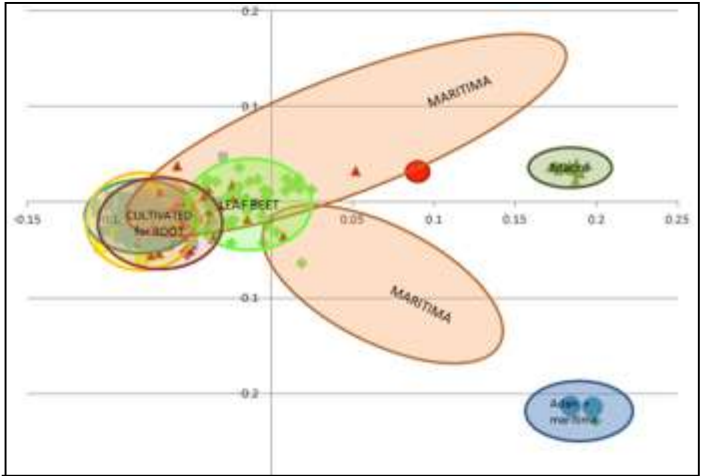
New commercial
germplasm

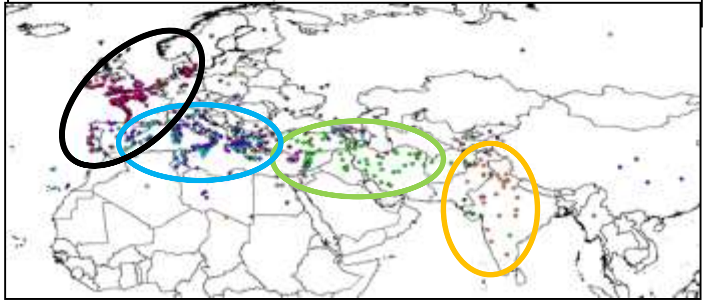
AKER GENETIC DIVERSITY



AKER GENETIC DIVERSITY

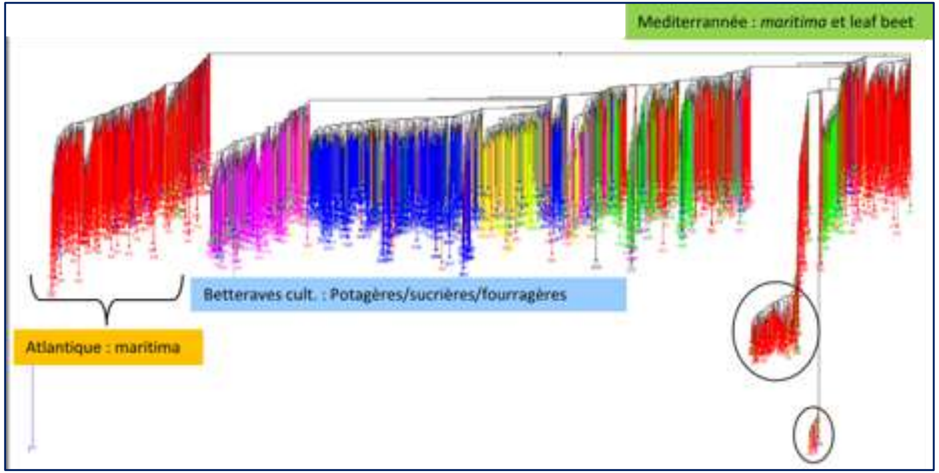
RESULTS





Representation of the DAPC clusters on the map

(*B. macrocarpa* and *B. adanensis* were discarded because of their strong distance from other groups)

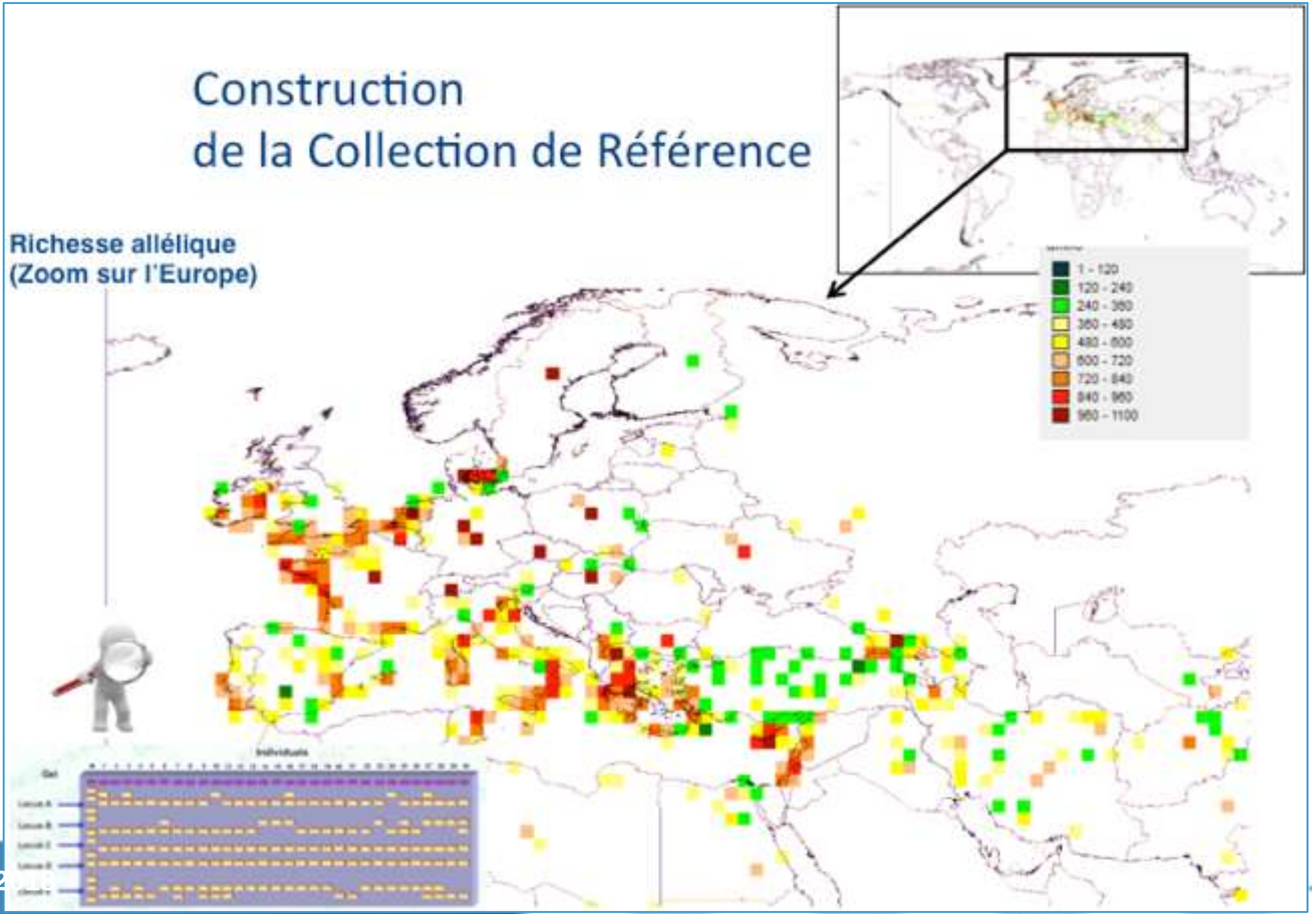


40 ACCESSIONS representing 100% of the total allelic variation

15 ACCESSIONS representing 100% of all allelic variation not included in the allelic richness of elite germplasm

AKER GENETIC DIVERSITY

RESULTS

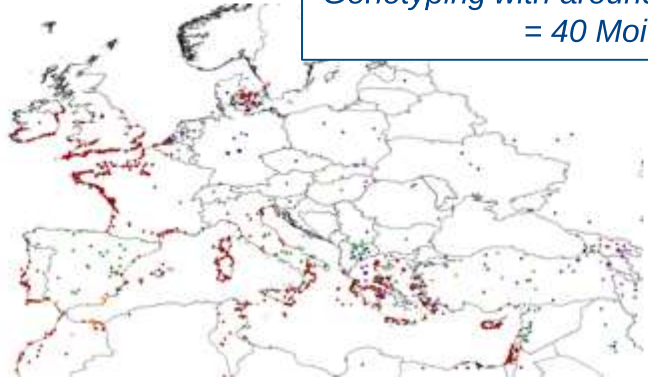


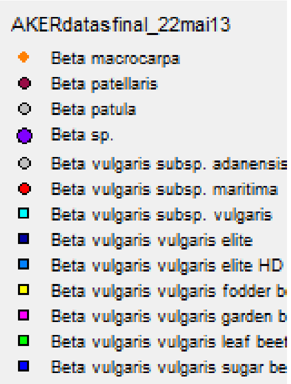
Construction de la Collection de Référence

Richesse allélique (Zoom sur l'Europe)

GENOTYPING - DIVERSITY

Genotyping with around 2 Mio SNPs and 38 Moi DArTs
= 40 Moi Mol. Marker Data





AKERdatasfinal_22mai13

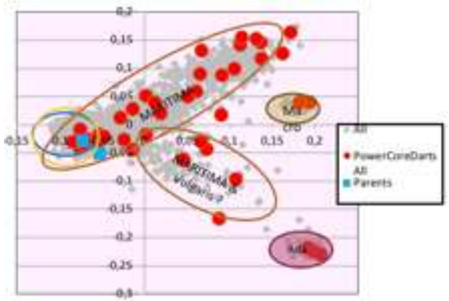
- ◆ Beta macrocarpa
- ● Beta patellaris
- ○ Beta patula
- ● Beta sp.
- ○ Beta vulgaris subsp. adanensis
- ● Beta vulgaris subsp. maritima
- ☐ Beta vulgaris subsp. vulgaris
- ■ Beta vulgaris vulgaris elite
- ■ Beta vulgaris vulgaris elite HD
- ☐ Beta vulgaris vulgaris fodder b
- ☐ Beta vulgaris vulgaris garden b
- ☐ Beta vulgaris vulgaris leaf beet
- ■ Beta vulgaris vulgaris sugar be

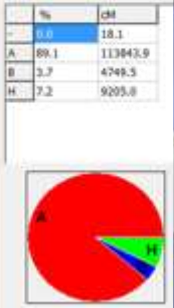
Karine Henry, AKER Sc. Coord.

"The 15 accessions cover 100% of the variability"

3,000 accessions collection from 46 genebanks

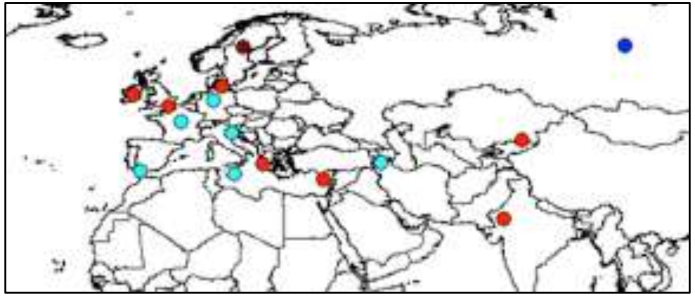
Selection of 15 accessions based on the diversity analysis

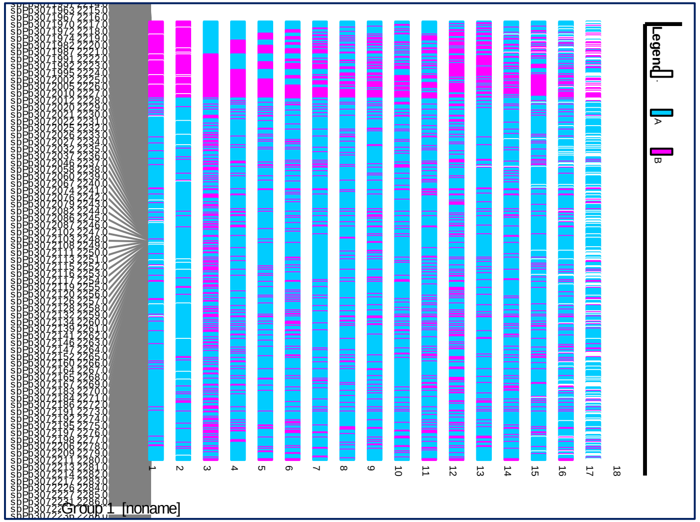


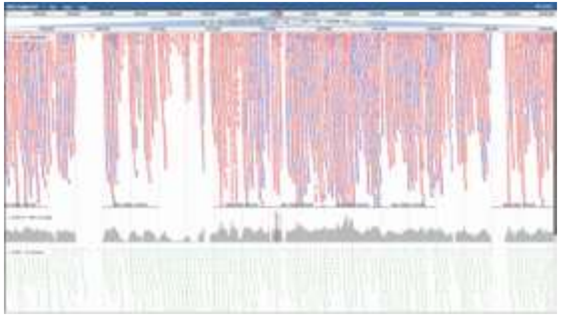


	%	cM
-	0.0	18.1
A	89.1	113843.9
B	3.7	4749.5
H	7.2	9205.0

CORE COLLECTION





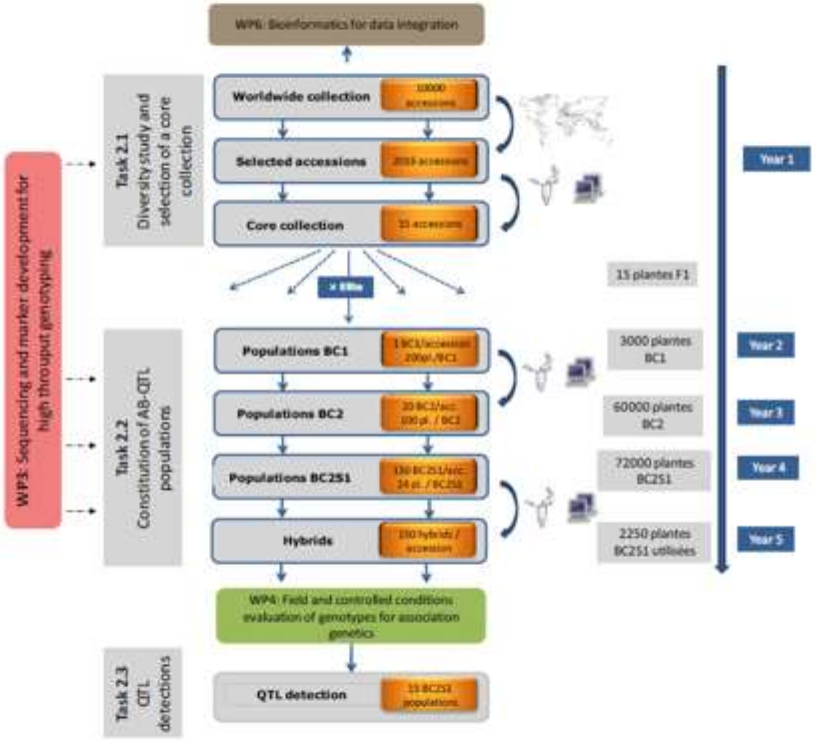


AFFYMETRIX

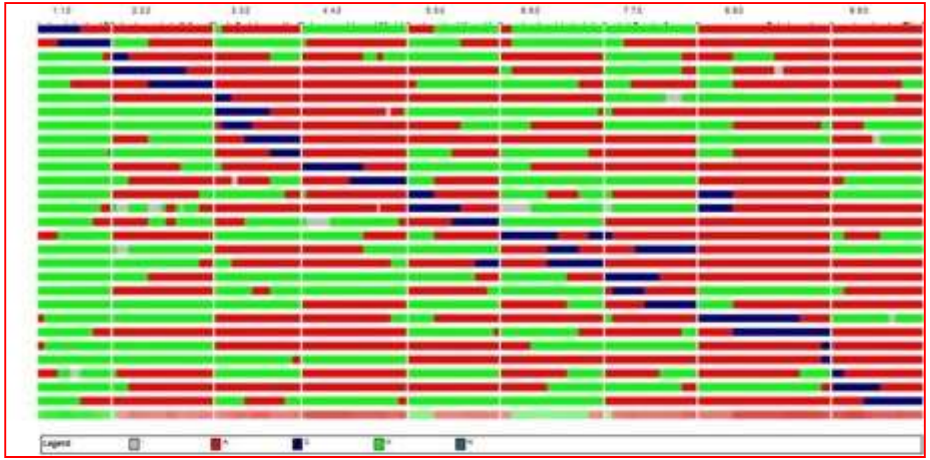
Tuesday 19th of June, 2018
Venise, Italy

AKER GENETIC DIVERSITY

Srategy



Strategy - Results



Nr_plants	µ (segment)	max (segm)	min (segm)
28	3,6	8	2
198	3,1	8	1

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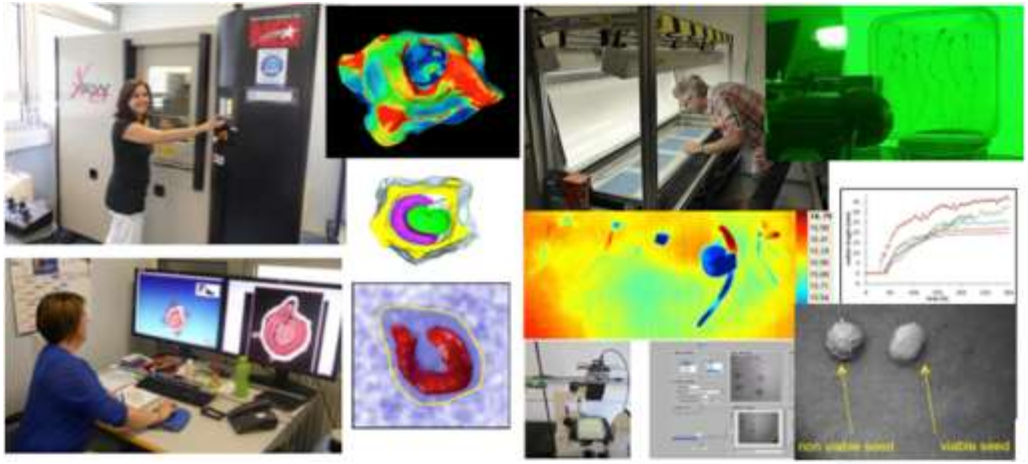
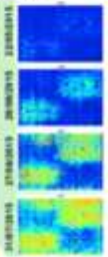
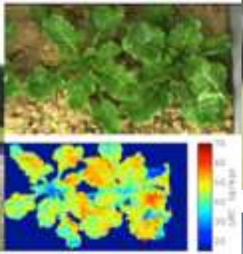
Phenotyping







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Venise, Italy

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Beet Ontology

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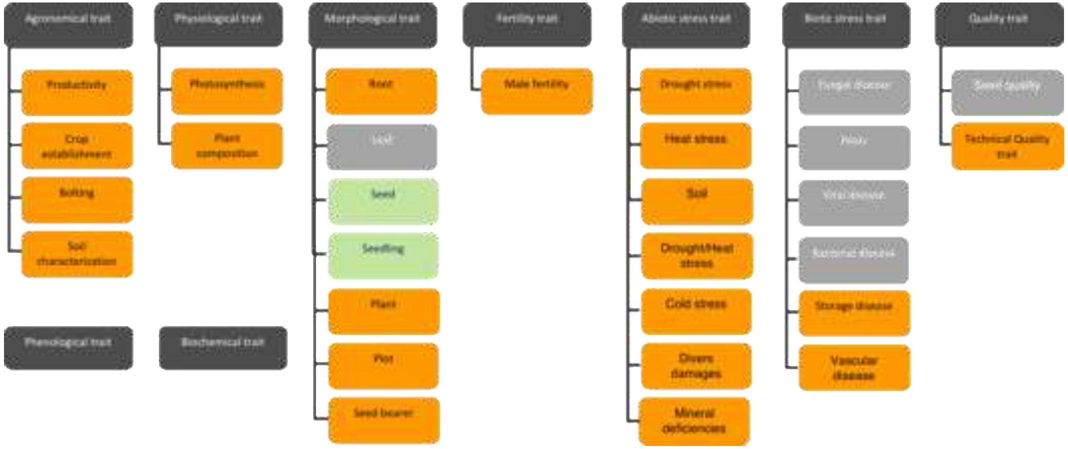
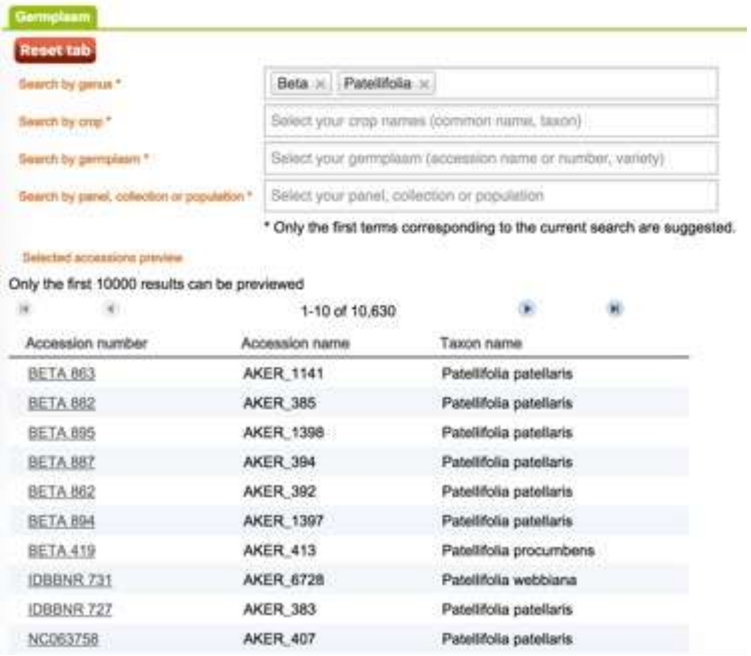
https://urgi.versailles.inra.fr/ephesis/ephesis/ontologyportal.do

https://ais.florimond-desprez.fr/ephesis/ephesis/ontologyportal.do

http://www.cropontology.org/ontology/CO_333/Beet%20Ontology

Beet Ontology (v 1.0) August 2017





Search by genus *: Beta ✕ Patellifolia ✕

Search by crop *: Select your crop names (common name, taxon)

Search by germplasm *: Select your germplasm (accession name or number, variety)

Search by panel, collection or population *: Select your panel, collection or population

* Only the first terms corresponding to the current search are suggested.

Selected accessions preview

Only the first 10000 results can be previewed

1-10 of 10,630

Accession number	Accession name	Taxon name
BETA 863	AKER_1141	Patellifolia patellaris
BETA 882	AKER_385	Patellifolia patellaris
BETA 895	AKER_1398	Patellifolia patellaris
BETA 887	AKER_394	Patellifolia patellaris
BETA 862	AKER_392	Patellifolia patellaris
BETA 894	AKER_1397	Patellifolia patellaris
BETA 419	AKER_413	Patellifolia procumbens
IDBBNR 731	AKER_6728	Patellifolia webbiana
IDBBNR 727	AKER_383	Patellifolia patellaris
NC063758	AKER_407	Patellifolia patellaris

AKER PARTNERSHIPS

ADAPT - Landscape Genetic - Domestication

Landscape genetic – Accession distribution and eco-geographical zonation

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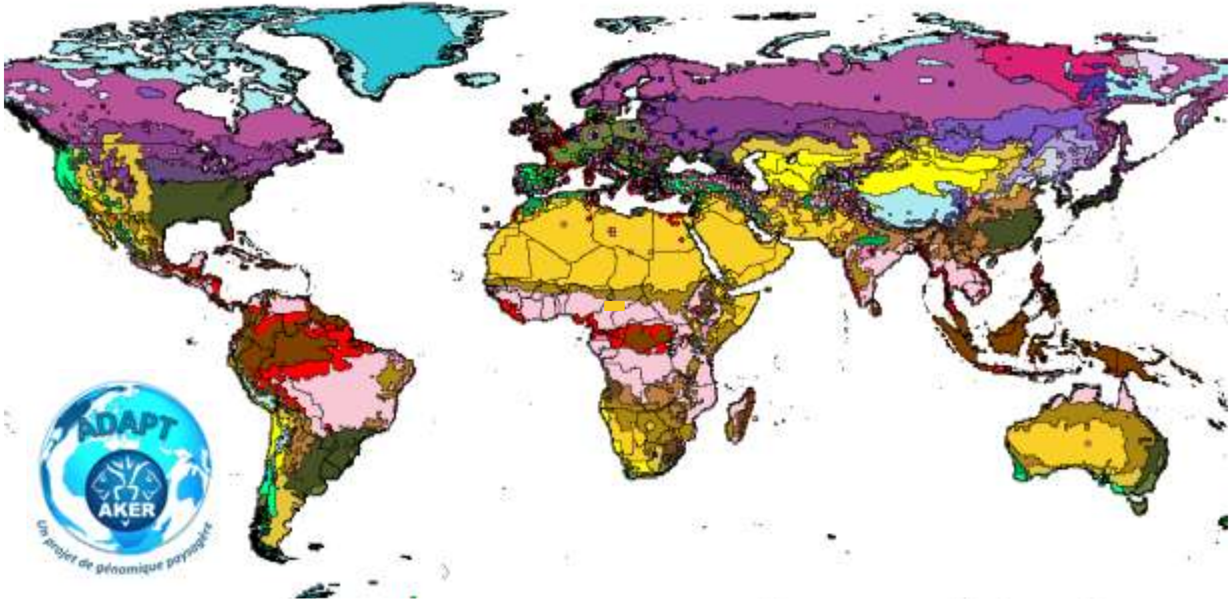

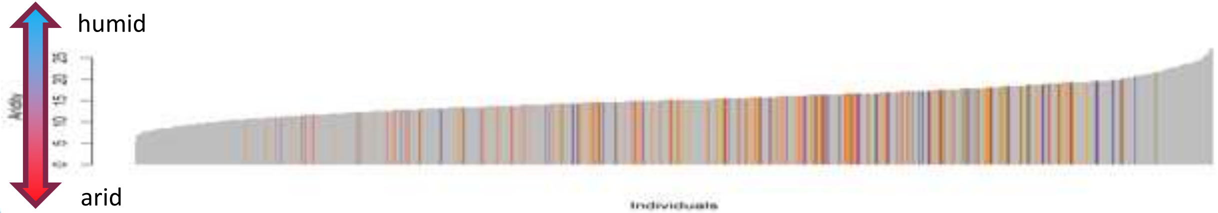

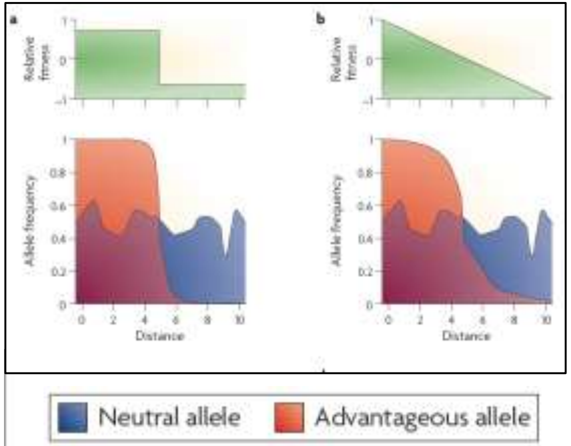

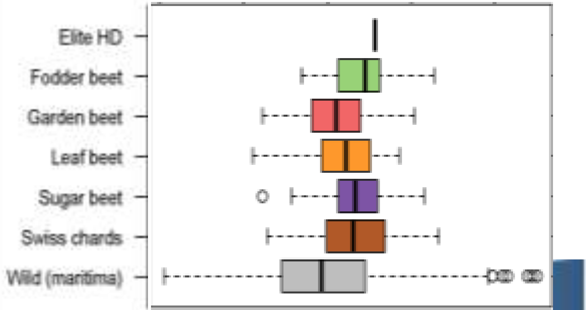

AKER PARTNERSHIPS

BE DOMINO - Beet Domestication

Be Domino

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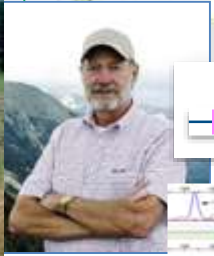
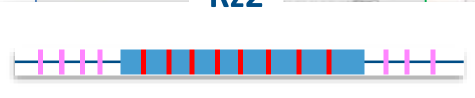
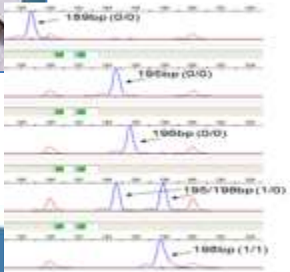
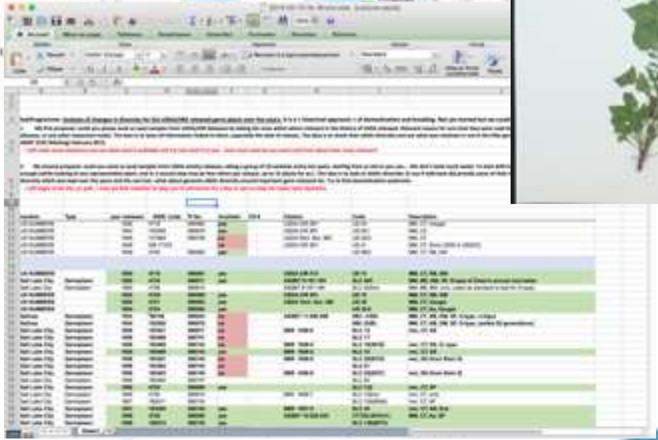
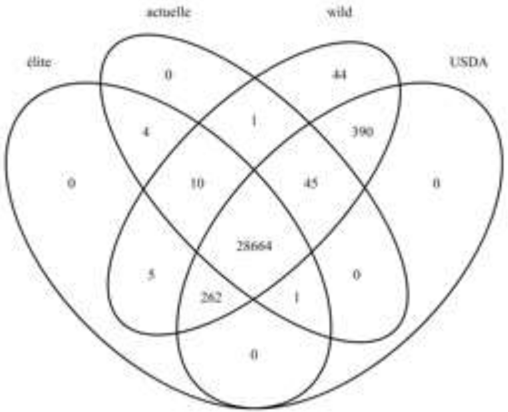


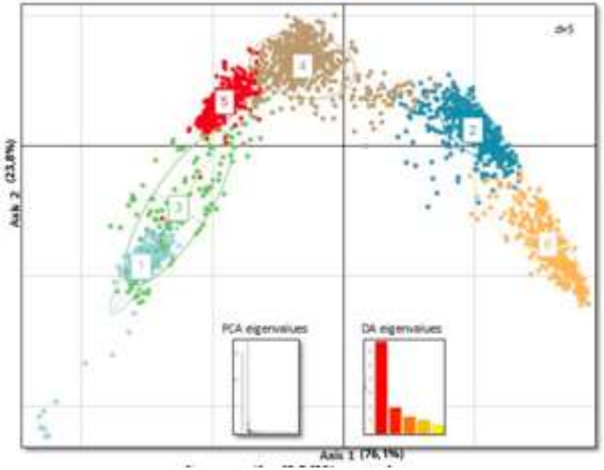








Genetic structure in the global population: a more precise genetic differentiation



***Board 2* : Cluster compositions**

	Elites	Wild	Current varieties	USDA	TOTAL
Cluster 1	2%	0%	**96%**	2%	100%
Cluster 2	0%	**99.7%**	0%	0.3%	100%
Cluster 3	**93%**	0%	0%	7%	100%
Cluster 4	10%	16%	4%	**70%**	100%
Cluster 5	4.7%	0.3%	**80%**	15%	100%
Cluster 6	0%	**100%**	0%	0%	100%

- **1st axis** : Wild accessions are far from current varieties and elite lines
  ⇒ Elite lines and current varieties are close
- **Cluster 1** : Some distinct accessions
  Cluster 3 : Diversity for a lot of elite lines
- **2nd axis** : USDA accessions "make a link" between many wild accessions and many current varieties
  2 "pools" of current varieties joined by elite lines

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Be Domino

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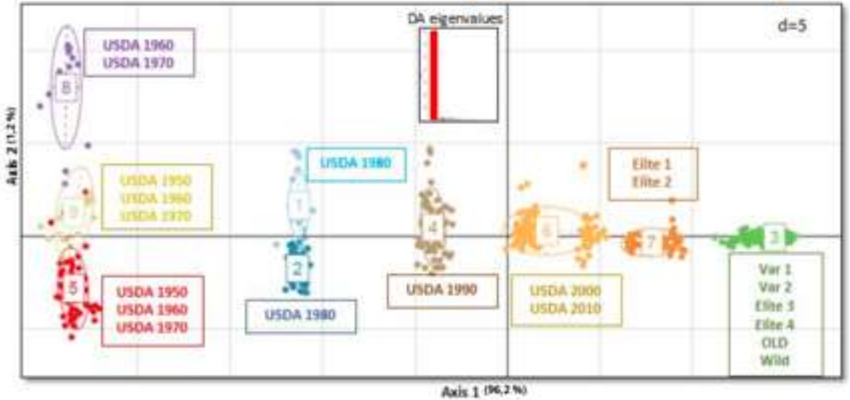
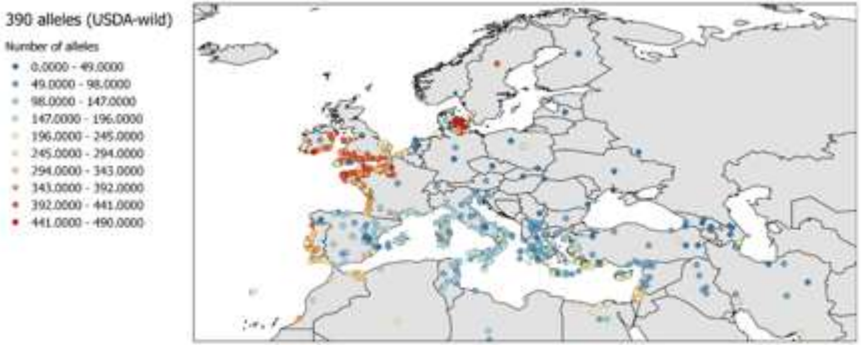
Genetic differentiation in the different subpopulations selected: temporal analysis





AKLER'S TEAM

Betterave2020

ANR – 11 – BTBR - 0007

Soutenu par

Vers une sélection de précision…

http://www.aker-betterave.fr

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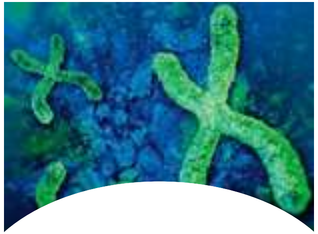


European Cooperative Programme for Plant Genetic Resources

ECP/GR

Bruno Desprez

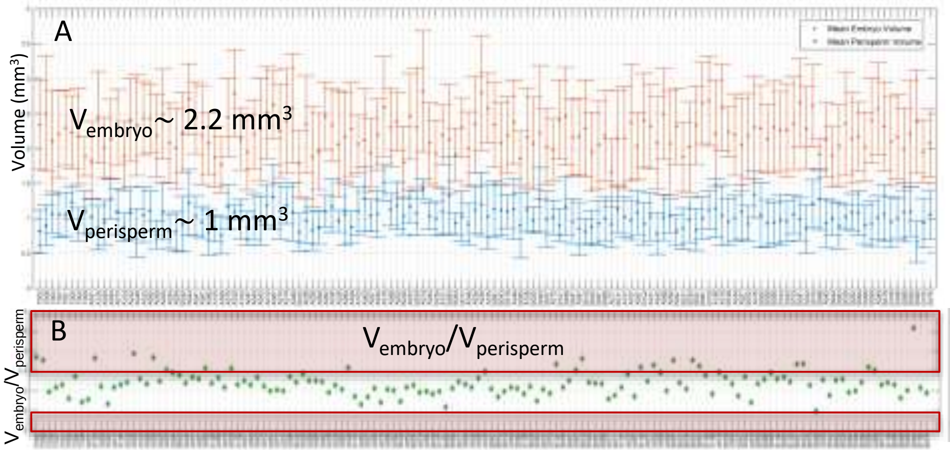
Venise, I

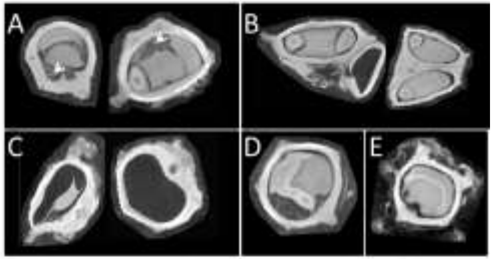
19th June 2018

Thank you for your attention !

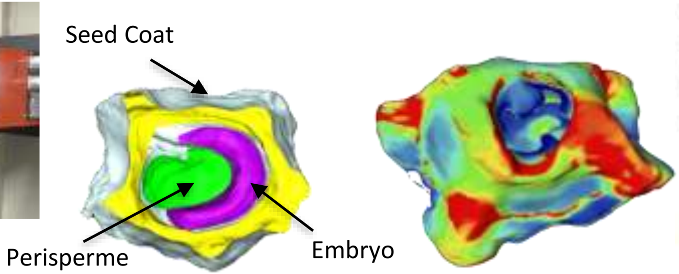
Internal seed morphology phenotyping by Xray computed microtomography

Results on the pilot population (PP) : Embryo and perisperm volumes for different genotypes





Particular cases causing image processing failure :(A) Necrotic aspect; (B) Multi-germ seeds; (C) Empty seeds ; (D) Embryo malformation; (E) Unbrushed/badly brushed seeds



Results on the pilot population (PP) : Seed Coat volumes for different genotypes